

QPCODE

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) CHEMISTRY
THIRD SEMESTER EXAMINATION- MODEL QUESTION PAPER
DSC A - MG3DSCCHE201- ORGANIC CHEMISTRY-1
(2024 ADMISION ONWARDSADMISSION ONWARDS)

Duration: 1.5 hours

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)


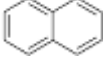
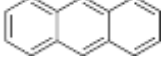
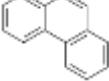
Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

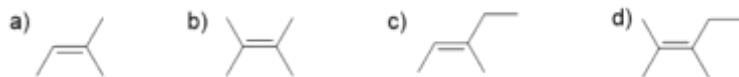
Part A

Multiple choice questions

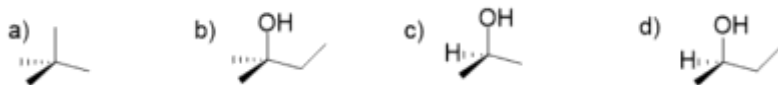
Answer all questions

Each question carries 1 marks

1. What is the main purpose of cracking in the petroleum industry? [K] / [1]
A) To remove sulphur from crude oil
B) To convert solid fuel into liquid fuel
C) To increase the yield of gasoline and other useful products
D) To extract pure methane from natural gas
2. Which of the following reagents is essential for the Wurtz reaction? [U] / [1]
A) Zinc and hydrochloric acid
B) Sodium metal in dry ether
C) Potassium hydroxide in ethanol
D) Concentrated sulfuric acid
3. Which among the following compounds is anthracene? [U] / [2]
a)  b)  c)  d) 
4. What is the resonance energy of benzene [K] / [2]
a) 150.6 kcal/mol b) 36 kcal/mol c) 61 kcal/mol d) 84 kcal/mol
5. What is the monomer of polythene? [K] / [1]
a) vinyl chloride b) ethylene c) propylene d) LDL
6. Which of the following compounds can exhibit geometrical isomerism. [An] / [3]



7. Analyse the structures of the following compounds and select the one that is chiral. [An] / [3]



8. Which among the following exist as gas at normal temperature and pressure? [K] / [1]

- a) acetylene b) octane c) tartaric acid d) polythene

9. Which of the following compounds is the most acidic? [U] / [1]

- a) ethane b) ethene c) ethyne d) methane

10. Which among the following is an anti-aromatic compound? [A] / [2]

- a) cyclopentene b) cyclopropene c) cyclobutadiene d) cyclopentadiene

[1x10 = 10]

Part B

Short Answer Questions

Answer any 4 questions

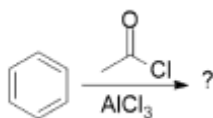
Each question carries 3 marks

11. Draw the mechanism of bromination of ethylene. [U] / [1]

12. Explain Huckel rule. [U] / [2]

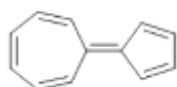
13. What is Lindlar's catalyst? Explain its composition and use in organic synthesis. Give one example of a reaction where it is used. [U] / [1]

14. Illustrate the mechanism of the following reaction and predict the product. [A] / [2]



15. Differentiate between D/L notation and d/l notation [U] / [3]

16. Explain why the given hydrocarbon exhibits polarity, using the concept of aromaticity to support your reasoning. [An] / [2]



[3x4 = 12]

Part C

Short Essay Questions

Answer any 2 questions

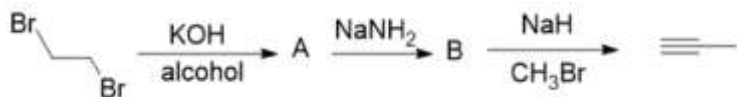
Each question carries 7 marks

17. Predict the possible products of the following reaction and justify which would be the major and minor products, supporting your answer with the appropriate reaction mechanisms. [E] / [1]



- 18 Draw the Newman projections for major conformations of n-butane about the C2–C3 bond. Explain their relative stabilities and sketch the energy profile for one full rotation. [U] / [3]

19. Predict the structures of products A and B in the given reaction scheme, and explain in detail the reasoning and steps you used to arrive at your answer. [E] / [1]



[2x7 = 14]

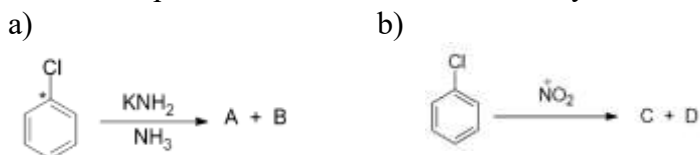
Part D

Essay Question

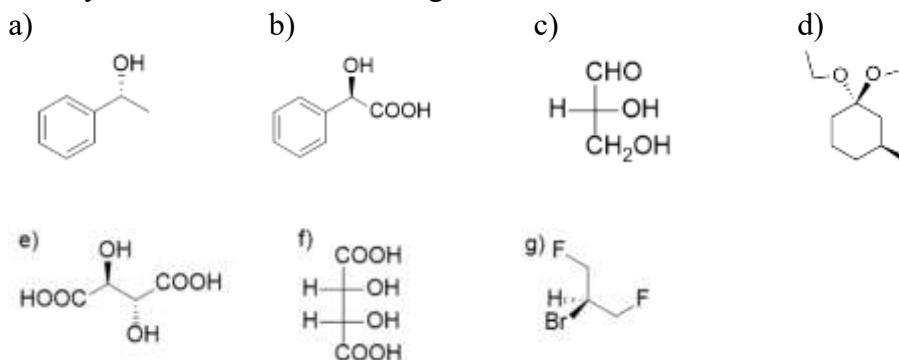
Answer any 1 question

Each question carries 14 marks

- 20 Predict the products A, B, C and D. Reason your answer. [An] / [2]



- 21 For each of the following molecules, predict whether it is chiral or achiral. For molecules containing chiral centres, assign the R and S configuration(s) to each chiral centre. Provide a detailed, step-by-step explanation of how you determined chirality and stereochemical configuration. [An] / [3]



[1x14 = 14]

QPCODE:

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) DEGREE EXAMINATION
THIRD SEMESTER

(2024 ADMISSION ONWARDS)

Discipline Specific Core Course (DSC B)

MG2DSCCHE202: INORGANIC AND ORGANIC CHEMISTRY

Duration: 1.5 Hr

Maximum Marks: 50

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)*

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A – Multiple Choice Questions (1×10 = 10 marks)

(Answer all questions. Each question carries 1 mark).

1. Which of the following is a radioactive isotope? [CO 1] [U]
a) C-12 b) C-14
c) O-16 d) H-1
2. Which unit is used to measure radioactivity? [CO 1] [K]
a) Watt b) Becquerel
c) Newton d) Pascal
3. Give an example of iron-Sulphur protein [CO 2] [U]
a) Cytochrome b) Ferredoxin
c) Cobalamin d) Haemoglobin
4. Which is the oxygen-carrying protein in blood? [CO 2] [U]
a) Insulin b) Myosin
c) Hemoglobin d) Actin
5. What is the hybridization of the ring atom in an aromatic compound? [CO 3] [U]
a) sp b) sp²
c) sp³ d) None of the above
6. Which of the following is an example of polycyclic aromatic compound? [CO 3] [U]
a) Furan b) Pyridine
c) Pyrrole d) Anthracene

7. What is the role of BHA in food? [CO 4] [An]
 a) Sweetener b) Preservative
 c) Antioxidant d) Color enhancer
8. Which of the following is a non-permitted food color? [CO 4] [k]
 a) Sunset Yellow b) Erythrosine
 c) Metanil Yellow d) Indigo Carmine
9. Which of the following compounds shows optical isomerism? [CO 5] [U]
 a) Ethane b) Butane
 c) Lactic acid d) Cyclohexane
10. What is the shape of cyclohexane in its most stable form? [CO 5] [K]
 a) Chair b) Boat
 c) Planar d) Linear

Part B – Short Answer Questions

(4×3 = 12 marks)

(Answer any four questions. Each question carries 3 marks.)

11. Write a note on natural and induced radioactivity. [CO 1] [U]
 12. Describe the use of isotopes in radiotherapy. [CO 1] [U]
 13. What is the role of myoglobin in the human body? [CO 2] [K]
 14. Explain the effect of junk food on human health. [CO 4] [An]
 15. Discuss the structure and stability of benzene. [CO 3] [U]
 16. Draw and Explain the important conformation of n-butane [CO 5] [U]

Part C – Short Essay Questions

(2×7 = 14 marks)

(Answer any two questions. Each question carries 7 marks.)

17. Discuss the structure, function, and importance of hemoglobin and chlorophyll. [CO 2] [U]
 18. Explain the mechanism of aromatic electrophilic substitution reactions with examples. [CO 3] [K]
 19. Describe the concept of optical isomerism with reference to tartaric acid. [CO 5] [K]

Part D – Essay Type Questions

(1×14 = 14 marks)

(Answer any one question. Each question carries 14 marks.)

20. Explain the different types of stereo isomerism possible. Discuss about them with one example each [CO 5] [U]
 21. Explain in detail nuclear fission, fusion, and applications of nuclear chemistry in medicine and dating techniques. [CO 1] [U]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
Industrial Chemistry Minor
SEMESTER III
Model Question Paper
Course Code: MG3DSCICH200
Course Title: Functional Operations in Chemical Industry

Time: 1.5 Hours

Maximum Marks: 50

Section A

(Answer all questions. Each carries 1 mark.)

1. The flow in which fluid layers slide past each other without mixing is called [CO1, U]
A) Turbulent flow B) Laminar flow C) Compressible flow D) Viscous flow
2. The equipment primarily used for separating liquids based on boiling points is: [CO1, K]
A) Evaporator B) Extractor C) Crystalliser D) Distillation column
3. Reynolds number is an indicator of: [CO1, U]
A) Viscosity B) Flow regime C) Temperature D) Surface area
4. Which of the following is an example of an evaporator used in industry? [CO1, U]
A) Spray dryer B) Rotary evaporator C) Falling film evaporator D) Drum dryer
5. The Czochralski method is associated with: [CO2, U]
A) Solvent extraction B) Crystal growth C) Drying D) Distillation
6. The principle of solvent extraction is based on: [CO3, U]
A) Boiling point difference B) Solubility difference C) Pressure difference D) Surface tension
7. Which of the following is not a mixing equipment? [CO3, U]
A) Paddle mixer B) Trough mixer C) Flash evaporator D) Tumbler mixer
8. Steam distillation is mainly used for separating: [CO1, U]
A) Volatile immiscible liquids B) Inorganic salts C) Polymers D) Gases
9. Why is an MSMPR crystalliser preferred over a batch crystalliser in large-scale continuous production? [CO2, An]
A) It occupies less space and costs less.
B) It can handle multiple solutes simultaneously.
C) It maintains steady-state operation, allowing uniform crystal size and continuous output.
D) It avoids the need for temperature control.
10. The Verneuil method is a crystal growth technique used to produce: [CO2, A]
A) Sugar crystals B) Benzoic acid crystals C) Synthetic gemstones D) Proteins

(10 × 1 = 10 marks)

Section B – Short Answer Questions

Answer any four questions. Each carries 3 marks.

11. Define Bernoulli's principle. How is it applicable in fluid flow operations? [CO1, U]
12. Differentiate between laminar and turbulent flow with one example each. [CO1, U]
13. Explain the principle behind fractional distillation. [CO1, U]
14. Compare the Bridgman and Czochralski methods of crystal growth in terms of heat transfer mechanism and control over crystal quality. [CO2, An]
15. What are the basic steps involved in crystallisation? [CO2, U]
16. Define supercritical fluid extraction and mention one industrial application. [CO3, U]

(4 × 3 = 12 marks)

Section C – Short Essay Questions

Answer any four questions. Each carries 7 marks.

17. Describe the working of falling film and climbing film evaporators with diagrams. [CO1, U]
18. Explain the different types of distillation methods used in chemical industries. [CO1, U]
19. Discuss in detail the principle and techniques of crystal growth using Bridgman and Czochralski methods. [CO2, An]
20. Describe the construction and working of MSMR and draft tube crystallisers. [CO2, U]
21. Explain the process of liquid-liquid extraction and solid-liquid extraction with suitable examples. [CO3, U]
22. Compare the mixing mechanisms for solid-solid and liquid-liquid systems. Mention the mixers used in each. [CO3, U]

(4 × 7 = 28 marks)

QP Code:.....

Reg. No.

Name:.....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
THIRD SEMESTER MGU – UGP (HONOURS) REGULAR
EXAMINATION OCTOBER 2025

Third Semester (Model Question Paper)

Discipline Specific Elective – MG3DSECHE200 - Basic Analytical Chemistry

(2024 Admission Onwards)

Duration: 2 Hrs.

Maximum Marks: 70

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C),
Interest (I), Appreciation (Ap), and Skill (S)**

*Students should attempt atleast one question from each course outcome to enhance their
overall outcome attainability.*

[Learning Domain] [CO No(s)]

Part A

Short Answer Questions

Answer any *five* questions.

Each questions carries 4 marks

1. What are the importance of mean and variance in the statistical analysis of data? [U] [1]
2. Explain the role of ionic product and solubility product in the inter-group separation of cations in qualitative inorganic analysis. [U] [1]
3. Briefly discuss the importance and advantages of maintaining a laboratory notebook as a safe laboratory practice. [A] [2]
4. How do you carryout the calibration of a standard flask? [K] [2]
5. What is a redox reaction? Explain the chemistry of KMnO_4 reacting with ferrous ion. [A] [3]
6. Write down the steps involved in the gravimetric estimation of barium as barium sulphate. [K] [3]
7. Explain the basic concepts of chromatography. Which are the most widely used chromatographic techniques in analysis of samples? [A] [4]

(5 x 4 = 20)

Part B

Short Essay Questions

Answer any *five* questions.

Each questions carries 7 marks

8. Briefly discuss the basic principles of regression analysis. [U] [1]
9. What are determinate and indeterminate errors? How would you reduce the determinate errors in an experiment? [U] [1]
10. Describe the safety precautions you must take while working in a chemical laboratory. [K] [2]
11. What are interfering anions? Explain how borate and phosphate interfere in the analysis of cations via inter – group separation. [U] [1]
12. Which is the indicator used in the titration of EDTA against Zn^{2+} ions? Explain the principle of indicator action in this titration. [U] [3]
13. Explain how recrystallization and precipitation help in separation and purification of components of mixtures. [K] [4]
14. Briefly discuss the basic principles and applications of HPLC and gas chromatography. [A] [4]

(5 x 7 = 35)

Part C

Essay Questions

Answer any *one* questions.

Each questions carries 15 marks

15. Explain various types of conductometric titrations of acids and bases with suitable examples. [U] [3]
16. Discuss the basic principles of separation techniques (a) fractional distillation (b) solvent extraction. [A] [4]

(1 x 15 = 15)

END OF THE QUESTION PAPER

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
THIRD SEMESTER EXAMINATION
Model Question Paper
MG3DSECHE201 – INTRODUCTION TO NANOSCIENCE
(2024 ADMISSION ONWARDS)

Duration: 2 hrs

Max. Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation (Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer Type Questions

Answer any 5 questions. Each question carries 4 marks

1. What are semiconductor quantum dots? Give one method for its synthesis with example. [R] [CO: 3]
2. Compare the properties of single walled and multiwalled carbon nanotubes. [R] [CO:3]
3. List any four applications of nanomaterials in medicine and health care. [U] [CO:4]
4. What are piezo electric nanomaterials? How is it useful in energy storage? [U] [CO: 4]
5. Discuss the applications of scanning electron microscopy. [U] [CO:2]
6. Write short note on SIMS. [R] [CO: 2]
7. Classify nanomaterials based on their dimensions with examples. [U] [CO: 1]

Part B

Short Essay Type questions

Answer any 5 questions. Each question carries 7 marks

8. How does nature inspire nanotechnology? Demonstrate with examples. [A] [CO:1]
9. Discuss the advantages and applications of STM and Auger electron microscopy in nanoscience. [U] [CO: 2]
10. Explain the sensing applications of nanomaterials. Discuss how is it useful in defence purposes with suitable examples. [A] [CO:4]
11. Give one synthesis method for magnetic nanoparticles. Explain its properties and real-world applications. [A] [CO: 3]
12. Discuss the instrumental features, principle and applications of AFM. [U] [CO: 2]

13. How nanotechnology is useful in water purification and air pollution control? [U][CO:4]
14. Explain how IR, UV-visible and X-ray Photoelectron spectroscopy is helpful in the characterization of nanomaterials. [A][CO:2]

Part C

Essay Type questions

Answer any 1 question. Each question carries 15 marks

15. Illustrate the synthesis methods for the preparation of nanomaterials [U] [CO: 1]
16. A) Compare Scanning electron microscope and Transmission electron microscope and explain how it is helpful in nanoscience. B) Applications of nanotechnology in data storage and displays. [U] [CO:2,4]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
THIRD SEMESTER EXAMINATION

Model Question Paper
MG3DSECHE202 – SAFE LABORATORY PRACTICES IN CHEMISTRY
(2024 ADMISSION ONWARDS)

Duration: 2 hrs

Max. Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation (Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer Type Questions

Answer any **5** questions. Each question carries **4** marks

1. Briefly mention the basic safety rules while handling laboratory chemicals (CO 1, U)
2. Which is more effective for eye protection in a high risk lab: safety glasses or goggles? Justify your answer. (CO 1, A)
3. What are importance of safety data sheets and chemical labels (CO 2, A)
4. How should biological samples be disposed of safely, and why is proper disposal important?? CO2, U)
5. How do we respond to a chemical spill CO 3, A
6. Why are emergency showers and eyewash stations a must-have in any laboratory? CO 3 U
7. What steps should be followed for the safe and effective use of a fume hood? CO 4, U

Part B

Short Essay Type questions

Answer any 5 questions. Each question carries 7 marks

8. Briefly mention the basic safety rules while handling laboratory chemicals CO 1, U
9. Which is more effective for eye protection in a high risk lab: safety glasses or goggles? Justify your answer. CO 1, U
10. What are importance of safety data sheets and chemical labels CO 2 A
11. How should biological samples be disposed of safely, and why is proper disposal important?? CO 2, U
12. How do we respond to a chemical spill CO 3 U
13. Why are emergency showers and eyewash stations a must-have in any laboratory? CO3 An
14. What steps should be followed for the safe and effective use of a fume hood? CO 4, A

Part C

Essay Type questions

Answer any 1 question. Each question carries 15 marks

15. Describe the four principles safety. CO 1, U
16. Compare and contrast safety considerations of oil baths and sand baths CO3, An

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
THIRD SEMESTER EXAMINATION
Model Question Paper
MG3VACCHE200 – FORENSIC CHEMISTRY
(2024 ADMISSION ONWARDS)

Duration: 1.5 HRS

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple choice questions

Answer all questions

Each question carries 1 marks

1. Which organ is primarily affected in lead poisoning [U] [CO:1]
A. Kidney B. Heart C. Lungs D. Liver
2. The first step in the treatment of poisoning is to [A] [CO:1]
A. Administrate antidote B. Identify the poison
C. Gastric Lavage D. Airway, Breathing and circulation
3. Which antidote is used in Cyanide poisoning? [K] [CO:1]
A. Atropine B. EDTA C. Sodium thiosulphate D. Naloxone
4. What is the primary explosive component in gelatine sticks used in human bombs? [U] [CO:2]
A. Ammonium Nitrate B. RDX C. Nitroglycerin D. TNT
5. RDX is a powerful explosive. What does RDX stand for? [U] [CO:2]
A. Reactive Detonating Xenon B. Rapid Detonation Explosive
C. Research Development Explosive D. Royal Demolition Explosive
6. What is the name of the black residue left by gunpowder after firing? [U] [CO: 2]
A. Gun metal B. Bullet grease C. Gunshot residue (GSR) D. Metal shavings
7. In traced forgery, how is the signature produced? [U] [CO: 3]
A. From memory B. With a different writing instrument
C. By placing transparent paper over the genuine signature and copying it
D. Using ink erasure
8. Which of the following is a confirmatory test for urine in forensic analysis? [U] [CO:4]
A. Iodine test B. Phadebas test
C. DMAC (p-Dimethylaminocinnamaldehyde) test D. Teichmann test

9. What is DNA fingerprinting primarily used for in forensic science? [A] [CO:4]
A. Measuring blood pressure
B. Identifying handwriting styles
C. Identifying individuals based on their genetic material
D. Determining age of bones

[1x9 = 9]

Part B

Short Answer Questions

Answer any 5 questions

Each question carries 4 marks

10. Describe the classification of poisons based on their mode of action [U] [CO:1]
11. Write a note on neutron activation analysis [U] [CO:1]
12. Describe the composition of a bullet [U] [CO:2]
13. Explain the working of a metal detector [U] [CO:2]
14. Discuss the inherent signs of forged signatures [U] [CO: 3]
15. Explain the types of fractures that occur in glass during impact [A] [CO: 4]
16. What is DNA finger printing [U] [CO: 4]

[4x5 = 20]

Part C

Short Essay Questions

Answer any 3 questions

Each question carries 7 marks

17. Explain the general treatments and antidotes provided for a poisoning case. [U] [CO:1]
18. Explain the detection of accidental explosion due to fire works and matches. [U] [CO:2]
19. Discuss the different types of signature forgeries [K] [CO: 3]
20. Explain the various methods used to detect the purity of gold [U] [CO: 3]
21. What do you mean by traces and tracks? Explain. [U] [CO: 4]

[7x3 = 21]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
THIRD SEMESTER EXAMINATION
MGEDSCHE200-INORGANIC CHEMISTRY-1
MODEL QUESTION PAPER

Duration: 1.5 Hours

Maximum Marks: 50

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)*

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple choice questions

Answer All questions

Each question carries 1 marks

1. The Born-Haber cycle is used to calculate
 - a) Ionisation energy
 - b) Lattice energy
 - c) Electron affinity
 - d) Electron density

(CO-1 , U)

2. Fajan's rule helps to predict
 - a) Molecular Structure
 - b) Hybridization
 - c) Dipole moment
 - d) Covalent character in ionic compounds

(CO-1 , U)

3. According to VSEPR theory what is the structure of SF₆
 - a) Linear
 - b) Octahedral
 - c) Tetrahedral
 - d) Square planar

(CO-1, A)

4. Bond order of N₂ is
 - a) 1
 - b) 2
 - c) 3
 - d) 4

(CO-1, A)

5. The common oxidation state of lanthanides is
 - a) +2
 - b) +3
 - c) +4
 - d) +1

(CO-2,K)

6 The atom bomb is based on which nuclear process

- a) Nuclear fusion
- b) Nuclear Fission
- c) Electron capture
- d) Alpha decay

(CO-3, U)

7 The half life of a radioactive isotope is

- a) The time required for half of the radioactive nuclei to disintegrate
- b) Time taken for the nucleus to emit all radiation
- c) Time taken for nucleus to disintegrate completely
- d) Time taken for energy to reduce to half

(CO-3, U)

8 Give an example for ambidentate ligand

- a) EDTA
- b) SCN^-
- c) NH_3
- d) H_2O

(CO-4, U)

9 Which is an example for weak field complex

- a) CN^-
- b) CO
- c) NO_2^-
- d) I^-

(CO-4, U)

10 The color of coordination compounds is mainly due to

- a) Charge transfer
- b) Proton transfer
- c) d-d transition
- d) MLCT

(CO-4, U)

[1x10 = 10]

Part B

Short Answer Type questions

Answer any 4 question

Each question carries 3 marks

- 11. State Fajan's Rule and explain its significance in determining the nature of bonding. (CO-1, A)
- 12. Predict the geometry and hybridization of XeF_2 using VSEPR theory. (CO-1, U)
- 13. What is lanthanide contraction? What are its consequences? (CO-2, U)
- 14. Differentiate between natural and artificial radioactivity . Give examples of each. (CO-3, U)
- 15, What are chelates ? Give examples. (CO-4, K)
- 16. Discuss the geometrical isomerism in Ma_3b_3 type complexes with examples. (CO-4, U)

[4x3 = 12]

Part C

Short Essay Type Questions

Answer any 2 question

Each question carries 7 marks

17. Describe how hybridization helps in explaining the geometry of XeF_4 and SF_6 . (CO-1, U)
- 18 Discuss on the separation of lanthanides by Ion exchange method. (CO-3, U)
- 19 Explain how d orbital splitting in tetrahedral complexes differs from octahedral complexes. Give the splitting in both complexes. (CO-4, A)

[2x7 = 14]

Part D

Essay Type Questions

Answer any 1 question

Each question carries 14 marks

- 20 Give the difference between nuclear fission and nuclear fusion. Discuss on their advantages and disadvantages. (CO-3, U)
- 21 Discuss the characteristics of transition metal. Comment on how it differs from other elements in the periodic table. (CO-4, An)

[14x1 = 14]